joint offers a better prognosis, and the trephining, if done early, cuts the whole disease short and prevents all serious complications.

ON OSTEOMATÁ OF THE NASAL CAVITY.

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BORNHAUPT[1], in 1880, gave for the first time an excellent description of the bony tumors developing in the neighboring cavities of the orbit, and at that time was able to collect from medical literature 49 such cases, 23 osteomata of the frontal sinus, 11 of the ethmoidal cells, 10 of the antrum Highmori and 5 of the sphenoidal or ethmoidal cells. Not until 1887 were these tumors again made the subject of a statistical survey by Andrews[2], who published 2 new cases of his own of successful removal of osteoma of the orbit. He has tabulated altogether 50 cases, evidently rejecting some that had been included in Bornhaupt's statistics. Neither of these authors makes any mention of tumors growing into the nasal cavity, and I can discover only 3 cases recorded by Légouest[3], Tillmanns[4] and Habermaas[5], in which the tumor had developed into and occupied the entire nasal fossa, and 2 in which the tumor had grown into the orbit and nasal fossa, recorded by Mott[6] and by Fenger[7]. The rarity of the affection may warrant the narration of a case, which came under my observation years ago at the surgical clinic in Freiburg, as assistant

[1] Bornhaupt. *Archives f. Klin. Chirurgie*, vol. xxvi, p. 589.

[2] Andrews. *Medical Record*, Sept. 3, 1887.

[3] Légouest, *Gazette Hebdom*, x, 1863.

[4] Tillmanns, *Archiv. f. Klin. Chirurgie*, vol. xxxii, page 677.

[5] Habermaas, *Mittheil, aus der Chirurg. Klinik, Tübingen*, i, 376.

[6] Mott, *American Journal of Med. Sciences*, Jan. 1857.

[7] Fenger, *Journal of American Medical Association*, vol. xi, 1888, p. 185.

to Prof. Maas, late of Wurzburg, and which has not been previously published.

M. R., æt. 17 years, has always been healthy, but is a rather badly nourished and anæmic girl. When 11 years old she fell on the pavement, striking it with her face, especially the region of the nasal bones. Aside from severe hæmorrhage from the nose and diffuse swelling over the entire face, which disappeared in a few weeks, no untoward symptoms developed. The region of the nasal bones never returned to its normal size, but always remained broader than before the injury. Four and a half years later, and half a year before her admission to the clinic, the swelling increased and difficulty in respiring through the right nostril was experienced. These symptoms gradually became more pronounced until she entered the hospital. At that time the nasal bones were apparently symmetrically broadened, the right zygomatic region distinctly prominent. The right eye was slightly dislocated downward and outward, and the movements of the globe upward and outward were somewhat impaired. The ophthalmoscope revealed nothing abnormal. The right nasal fossa was absolutely impervious, and examination through the anterior nares disclosed a tumor completely filling out the former. The tumor was covered by apparently normal mucous membrane, and could be felt by the finger passed behind the soft palate, as well as seen during rhinoscopic examination. The same was not movable and of bony consistence.

The removal of the growth was attempted by a median incision along the ridge of the nose, a little to the right, laying open the right nasal fossa. The nasal bones had undergone atrophy to such an extent that they were easily severed from each other, and the right one from its attachment to the os frontis with the knife. On deflecting the soft parts of the right half of the nose in an outward direction, the tumor was found to fill out the entire fossa and to have its only attachment to the frontal or ethmoidal bone, as a probe could be readily introduced at either side of the mass and carried around its lower border to the other side. Its attachment was severed by a few strokes of a mallet and chisel, when the growth became movable, but could not be withdrawn on account of its size. An incision was now carried from the right ala nasi for an inch and a half in an outward and downward direction upon the cheek, and the soft parts were further detached from the superior maxilla, to expose its edge bordering on the anterior nares. The latter was chiseled off to the extent of about $^1/_2$ an inch from the infraorbital margin to anterior nasal spine. Now the anterior nares was sufficiently enlarged to permit the removal of the entire tumor with a strong forceps. The septum narium was deflected to the left. The inner wall of the right orbit was formed by the tumor itself, the orbital plate of the ethmoid and the laryngeal bone having entirely disappeared by atrophy. The turbinated bones had also disappeared. The antrum Highmori had evidently been invaded by the tumor, as no cavity was detected, and the growth bearing upon its lateral wall had caused the distinct prominence of the zygoma.

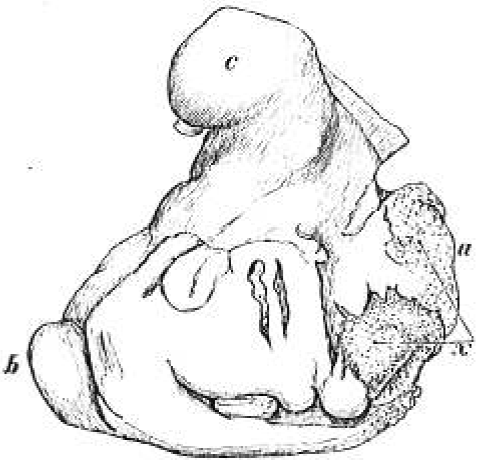

FIG. I. LATERAL VIEW OF THE TUMOR AFTER EXTIRPATION. NORMAL RELATIONS.

a. Anterior Portion.
b. Posterior Portion.
c. Nodule developed into right frontal sinus.
x. Points denuded in attempts at extraction.

The soft parts were now returned to their normal position and the incisions sutured. The patient made an uninterrupted recovery. She was seen a year later, when the right nasal fossa had somewhat diminished in size, the septum having to a certain extent returned to its normal position. She had suffered no further inconvenience.

After maceration and section the tumor proved to be an ivory osteoma, weighing $2^{1}/_{4}$ oz., in which no nucleus of spongy tissue was discernible, either in the centre or near the pedicle, as is generally the case.

I feel some hesitation in stating definitely that the osteoma developed either from the walls of the frontal sinus or within the ethmoidal cells. We gather from Bornhaupt's statistics that the ethmoidal bone is a locus prædilectionis as a starting point of the tumors under consideration. However, it seems that in many cases, especially where we have to deal with tumors of large size that have severed their bony connections, it will be difficult to determine precisely the place of their origin. In our case the nodule *c* (Figs. 1 and 2) had developed into the right frontal sinus and the only attachment the tumor had was at the point corresponding to the anterior part of the cribriform lamella of the ethmoid. The course of development of the osteoma, only a small part of it occupying the frontal sinus, also points to its origin in the nasal fossa, as these tumors primarily grow in a direction in which they meet the slightest resistance. In our case, although the tumor had destroyed the inner wall of the orbit, it had not encroached upon the orbital cavity to any extent, and had but slightly dis-

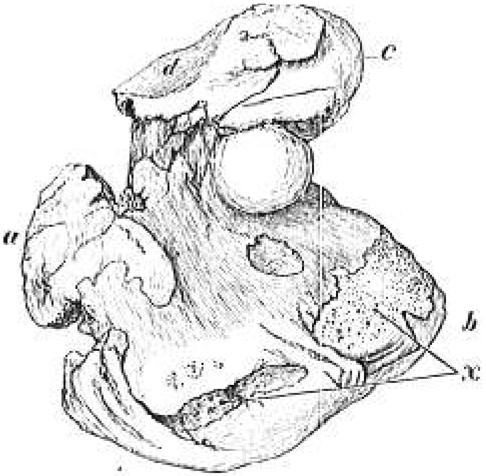

FIG. 2. MEDIAN VIEW OF THE TUMOR AFTER EXTIRPATION. NORMAL RELATIONS.

a, *b*, *c*, *x*. The same points as in Fig. 1. *d*. Orbital wall.

located the globe of the eye outward and downward. Fenger[1] says "as soon as the orbit is opened and in consequence the mucous membrane comes in contact with the connective tissue spaces of the orbital periosteum or the orbital connective tissue, an abscess forms." In our own case no suppuration had been set up, and it would seem from a perusal of the literature of the subject that in many cases in which the orbit had been opened no abscess formed there. These, it is true, were for the greater part tumors that had developed in the frontal sinus, which, however, it must be remembered, communicates with the nasal fossa. Perhaps a change in the character of the mucous covering and close approximation of the growth to the inner wall of the orbit may prevent an infection at the time of perforation. In Mott's case the osteoma had mainly developed into the orbital cavity, and here suppuration had followed. Habermaas' and Tillmanns' cases were identical with our own in many particulars. The tumors filled the entire nasal fossa and were of triangular shape, the base of the triangle corresponding to the floor of the fossa and the apex to the point of insertion. Legouest[2] also mentions that his osteoma formed a perfect cast of the nasal cavity. It had started from the floor of the nasal fossa, but at the time of operation had no bony attachment at all. Such was also the condition in Tillmanns' cases, and in both instances necrosis of the investing soft parts and consecutive suppuration were present. Habermaas' patient and my own did not suffer from any purulent discharge from the nose, and the soft parts investing the tumor were entirely intact, the points x in Figs. 1 and 2 having been denuded during attempts at extraction and other operative manipulations.

Where this is not the case, and where suppuration has been established, although the osteoma may give the impression of a sessile tumor, being tightly impacted in its bony surroundings, it will very often be found without attachment and easy to extract, when the bony cavity in which it is lodged is sufficiently opened. Dolbeau[3] first pointed out that such conditions frequently existed in osteomata of the frontal sinus. Tillmanns[1] operated for 3 dead osteomata on the same patient, 2 in the frontal sinus and 1 in the nasal cavity. This case, Légouest's and Fenger's, are the only ones of dead osteomata that I have found. It is very probable that these tumors all develop from the bone itself and remain in connection with their matrix for a long time. Such, at least, would seem to be the case when they develop into the nasal fossa. That considerable pressure can be exerted by the tumor upon the adjoining structures, even causing them to atrophy, without the life of the osteoma itself being impaired, is proved by our own case. Ulceration of the investing soft parts, suppuration and consequent insufficient nutrition seem to offer the best explanation of the necrosis of some of these tumors, of their separation and the formation of dead osteomata, in opposition to the theory of their parosteal origin, which, in the light of clinical experience, must now, it seems, be abandoned.

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[1] Fenger, l. c.

[2] Legouest, l. c.

[3] Dolbeau, *Bulletin de l'Acad. de Med.* xxxi, 1866.

In six of the cases collected by Bornhaupt, and in Fenger's case, the history points to traumatic origin of the tumors. In our own the trauma certainly appears to have played a prominent part in the etiology.

[1] Tillmanns, l. c.